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**STRUCTURAL AND RELATIONAL INTERDEPENDENCE AND  
ENTREPRENEURIAL ORIENTATION IN SMES:  
The Mediating Role of Internal Knowledge Sharing**

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**STRUCTURAL AND RELATIONAL INTERDEPENDENCE AND  
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**Abstract**

This study examines the intermediary role of internal knowledge sharing in the relationship between two aspects of SMEs' internal organizational context, namely, structural and relational interdependence and their entrepreneurial orientation (EO). With a sample of 146 SMEs, the structural equation modelling results show that higher levels of internal knowledge sharing associate with stronger EO and that such knowledge sharing derives from higher levels of task and reward interdependence, as well as from higher levels of social interaction and trust. The findings also reveal that internal knowledge sharing fully mediates the relationships between SMEs' task interdependence and trust with EO. The study contributes to small business research by highlighting several features of SMEs' internal environment that can be used to enhance their entrepreneurial postures.

**Keywords**

Entrepreneurial orientation, knowledge sharing, structural interdependence, relational interdependence, SMEs.

## **Introduction**

Continuously changing environments require small- and medium-sized enterprises (SMEs) to take on an entrepreneurial posture to develop and maintain competitive advantages (Harms et al., 2010; Kraus et al., 2012; Wiklund et al., 2009). Managers throughout the firm have pivotal influences on such entrepreneurial posture, which encompasses innovativeness, risk taking, and proactiveness (Covin and Slevin, 1991), particularly according to their ability to exchange knowledge with colleagues in other functional areas (Ginsberg and Hay, 1994; Hutchinson and Quintas, 2008; Martínez-Costa and Jiménez-Jiménez, 2009). Access to peer knowledge, thus, has an increasingly central role in the success of SMEs (Hughes et al., 2007; Wiklund et al., 2007), though we lack any explicit examination of the relationship between the internal knowledge sharing that takes place in SMEs and their entrepreneurial orientation (EO) (Aloulou and Fayolle, 2005; Wiklund and Shepherd, 2003).

Open knowledge flows do not emerge easily when firms are entrenched in their current activity sets (Leonard-Barton 1992), rely on their prior decisions (Hill and Birkinshaw, 2008) and ignore external signals about the need for change (Gilbert, 2005). Their decisions may suffer from complacency (Gargiulo and Benassi, 2000) or cognitive rigidity (Christensen and Bower, 1996), which is an issue that is particularly salient for SMEs, because they generally lack the internal resources to renew themselves continuously or protect themselves from complacency (Lubatkin et al., 2006). Understanding the role of knowledge sharing for SMEs' entrepreneurial activities thus requires an elaboration of the internal enablers of open knowledge flows within the firm. In particular, we lack a clear understanding of how specific elements of SMEs' internal

work context might shape the motivation of managers to go out of their way and openly share their knowledge with one another (Aloulou and Fayolle, 2005; Wiklund et al., 2007).

To address this gap, we investigate how two work context dimensions—structural and relational interdependence—inform SMEs’ internal knowledge sharing and subsequent entrepreneurial orientation (EO). Internal knowledge flows may encompass different facets of knowledge, such as explicit knowledge that can be directly codified versus tacit knowledge that is implicit and harder to formalize (Nonaka, 1994; Nonaka et al., 2000). We focus herein on the *overall level* of knowledge sharing within the firm (i.e., irrespective of whether the knowledge is explicit or tacit), which is manifest in issues such as the frequency and bidirectionality of internal communication (Grant, 1996; Mohr and Nevin, 1990). We seek to contribute to SME research by providing a theoretical elaboration of how such knowledge sharing represents a key mechanism by which SMEs’ internal work context informs their adoption of an EO.<sup>2</sup>

Extant research has devoted surprisingly scant attention to the drivers of SMEs’ EO (Aloulou and Fayolle, 2005)—though Poon et al. (2006) examine the role of founders’ personality traits—despite these firms’ strong inclination toward entrepreneurial action (Aloulou and Fayolle, 2005; Messeghem, 2003). Instead, the focus has centred mostly on the relationship between SMEs’ EO and their performance (Frishamar and Andersson, 2009; Harms et al., 2010; Hughes and Morgan, 2007; Kraus et al., 2012), along with the moderators that might underlie this relationship, such as company age (Runyan et al., 2008), family ownership (Campbell et al., 2012) or learning

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<sup>2</sup> SMEs’ engagement in entrepreneurial activities may also be shaped by their knowledge exchange with external stakeholders, such as customers (e.g., Yli-Renko et al., 2011), but our focus is on the internal drivers of SMEs’ EO.

mode (Hughes et al., 2007). In contrast, we investigate how SMEs' internal work context might affect their EO, through the knowledge sharing that it enables across the firm's ranks. Our investigation focuses on both formal (structural) and informal (relational) interdependences that can contribute to the firm's entrepreneurial endeavours (Burgers et al., 2009) but that have received little attention in prior SME research.

In particular, we discuss how structural and relational interdependences within SMEs' work contexts shape entrepreneurial endeavours through the promotion of internal knowledge flows. Structural interdependence pertains to the extent to which managers rely on one another's input when undertaking daily tasks (task interdependence), as well as the extent to which their individual rewards depend on their collective performance (reward interdependence) (Van der Vegt et al., 2000; Wageman and Baker, 1997). Relational interdependence captures the informality of the daily interactions among managers (social interaction) and the confidence that they have in one another's goodwill (trust) (Nahapiet and Ghoshal, 1998; Rousseau et al., 1998). We argue that SMEs' EO depends on the level of internal knowledge sharing, which in turn arises in work contexts marked by higher levels of structural and relational interdependence.

## **Theoretical Background**

### *EO, Internal Knowledge Sharing, and the Work Context*

A firm's EO can be manifest in different ways, such as a propensity to be innovative and continuously entertain new ideas or engage in experimentation, to reward risk and be open to high-risk projects, or to be proactive and beat competitors to new

market opportunities (Covin and Slevin, 1991; Miller, 1983; Monson and Boss, 2009).<sup>3</sup> In this study, we adopt the composite dimension approach to conceptualizing SMEs' EO (Covin and Slevin, 1989; Miller, 1983), according to which the dimensions underlying EO work concurrently.<sup>4</sup> We, therefore treat EO as 'a sustained firm-level attribute represented by the singular quality that risk taking, innovative, and proactive behaviors have in common' (Covin and Lumpkin, 2011, p. 863). With this approach we can examine how the internal functioning of SMEs affects their *overall* strategic posture.

Although prior SME research has focused predominantly on the performance consequences of EO, we consider its possible antecedents. In particular, given the importance of knowledge exchange (Floyd and Lane, 2000; Hutchinson and Quintas, 2008) and cross-functional collaboration (De Luca and Atuahene-Gima, 2007; Love and Roper, 2009) for the promotion of entrepreneurial activities, we argue that EO in SMEs increases with the free sharing of knowledge across different functional areas. We thus treat EO as a pervasive organizational phenomenon (Wales et al., 2011) that spans the entire SME and is critically informed by the extent to which knowledge resources that reside across the firm's ranks get combined and exploited. Our interest in the role of knowledge sharing, in combination with SMEs' internal work context, resonates with arguments that the explanation of firms' entrepreneurial endeavours requires a clearer understanding of the work-related mechanisms that underlie the presence of strong knowledge-sharing routines (Lin, 2010; Nahapiet and Ghoshal, 1998).

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<sup>3</sup> Although competitive aggressiveness and internal autonomy are also relevant facets of firms' entrepreneurial posture (Lumpkin and Dess, 1996), we focus on the three original dimensions introduced by Miller (1983).

<sup>4</sup> Covin and Lumpkin (2011) compare this composite dimension approach with a multidimensional view, that treats the dimensions as separate constructs. They suggest that neither approach is intrinsically superior, and that research along both directions can be fruitful. The composite dimension approach focuses on how different entrepreneurial dimensions *collectively* inform firms' strategic positioning relative to competitors.

The knowledge-based view of the firm suggests that exchanges between areas that span different knowledge domains can explicate how firms extend existing activity sets, because such exchanges fuel the creation of *new* knowledge (Grant, 1996; Spender, 1996; Szulanski, 1996). Because entrepreneurial activities connect intrinsically to firms' ability to enter new domains of knowledge, the combination of knowledge that is dispersed across the firm is a critical enabler of such activities (Carlsson et al., 2009; Floyd and Wooldridge, 1999; Levin and Cross, 2004). Intra-firm knowledge sharing that spans different functional areas thus is an instrumental building block of firm-level entrepreneurship, facilitating the conversion of knowledge held by individual managers into organizational knowledge (Floyd and Wooldridge, 1999).

Despite its possible benefits, intensive knowledge sharing may be challenging for managers in SMEs, who may feel as if they must relinquish power to peers (Kim and Mauborgne, 1998), particularly if they regard their own function-specific knowledge as an asset that needs protection from appropriation by others (Grant, 1996; Lovelace et al., 2001; Luo et al., 2006). Accordingly, we investigate how different elements of SMEs' internal work context help overcome these challenges and act as catalysts that promote the frequency and bidirectionality of internal knowledge flows. We focus on two contextual dimensions that might be relevant in this process: structural and relational interdependence.

Structural interdependence pertains to the intertwined nature of activities within the firm (Comeau and Griffiths, 2005). We consider two aspects, one that relates to managerial input (task interdependence) and another that concerns managerial output (reward interdependence). First, *task interdependence* reflects the interconnectedness of



tasks and the extent to which managers' daily work depends on the information, resources and support provided by colleagues in other areas (Fisher et al., 1997). The level of task interdependence increases when successful task accomplishment is more difficult without the assistance of colleagues in the firm. This facet of structural interdependence thus derives from the inputs required for successful task completion (Van der Vegt et al., 2002). Second, *reward interdependence* reflects the extent to which managerial rewards depend on collective performance that crosses different disciplines rather than individual performance (van der Vegt et al., 2002). In contrast with task interdependence, reward interdependence derives from managers' work output. The two types of interdependence do not necessarily covary (Wageman, 1995). For example, high or low reward interdependence may exist irrespective of the level of task interdependence, such as when managers successfully complete tasks individually but are held accountable for the performance of others in the firm (Mitchell and Silver, 1990; Van der Vegt et al., 1998).

We use a symmetric term, relational interdependence, to capture the intertwined nature of relationships within the firm. We again consider two aspects, one that speaks to the nature of inter-firm exchanges (social interaction) and another that reflects expectations of how exchange partners behave vis-à-vis one another. First, *social interaction* reflects the strength of the social relationships among managers, and particularly the informal character of these relationships (Nahapiet and Ghoshal, 1998). For example, firms may differ in the presence of close personal relationships between managers in their day-to-day activities, as well as the extent to which these managers spend significant time together in social situations outside work (Payne et al., 2011).

Second, *trust* represents the willingness of managers to leave themselves vulnerable to the actions of others in the firm (Rousseau et al., 1998). Our focus is on ‘goodwill’ trust, which reflects the belief that managers in the SME do not take advantage of one another, even if the opportunity to do so presents itself (Ring and Van de Ven, 1992)—not on alternative conceptualizations of trust, such as the predictability of others’ behaviours (Sitkin and Roth, 1993) or expectations about work-related competences (Lee, 2004).

In summary, we investigate the ability of SMEs’ internal knowledge flows to enhance their entrepreneurial orientation, as well as how such knowledge flows depend on the structural and relational interdependence of the internal work context. We summarize our conceptual framework and its constitutive hypotheses in Figure 1.

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Insert Figure 1 about here  
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## **Hypotheses**

### *Internal Knowledge Sharing and Entrepreneurial Orientation*

We posit that SMEs marked by higher levels of internal knowledge sharing should exhibit higher levels of EO. Entrepreneurial opportunities are multifaceted and complex (Grégoire et al., 2010), which typically makes them difficult to exploit alone (Tripsas and Gavetti, 2000). Intensive knowledge sharing in SMEs enables the development of relevant knowledge that can be used to match work-related problems with novel solutions (Cohen and Levinthal, 1990; Floyd and Lane, 2000). Thus, when intensive knowledge sharing takes place across functional areas, SMEs are better equipped to recognize and exploit entrepreneurial opportunities. Conversely, lower levels of internal knowledge sharing should lead to less EO.

The development of a diverse repertoire of knowledge, resulting from internal knowledge sharing routines, should also enable SMEs to discover a *wider* set of pathways for entrepreneurial activities, which, in turn, increases the perceived feasibility of such activities (Floyd and Lane, 2000). Firms can more rapidly and confidently act on entrepreneurial opportunities when they can compare and contrast different decision alternatives in parallel (Eisenhardt, 1989). For example, in their examination of mutual funds, Rao and Drazin (2002) find that the combination of diverse managerial skills within firms substantially increases the range of novel product categories that they consider and implement. Similarly, the multitude of alternatives afforded by the cross-fertilization of knowledge should make SMEs more efficient in comparing the relative strengths and weaknesses of the different pathways to entrepreneurship, such that their knowledge base can be applied more effectively to the selected alternative (Dimov, 2010). Conversely, in SMEs with lower levels of internal knowledge sharing, fewer alternatives to the current activity set will emerge, because managers are less confident or efficient in exploiting entrepreneurial opportunities, such that SMEs exhibit lower EO.

H<sub>1</sub>: There is a positive relationship between SMEs' internal knowledge sharing and entrepreneurial orientation.

#### *Role of Task Interdependence*

The level of task interdependence captures the extent to which undertaking daily tasks depends on the provision of input (information, support, or other resources) from colleagues in the firm (Fisher et al., 1997; Van der Vegt and Janssen, 2003). We hypothesize a positive relationship between such task interdependence and the level of knowledge sharing in SMEs. Resource dependence theory suggests that more

interdependent tasks are more complex and, thus, increase the need for enhanced knowledge flows for successful task accomplishment (Pfeffer and Salancik, 1978). When managers rely on one another to accomplish tasks, their ability to undertake their jobs successfully greatly depends on colleagues' resources and skills (Van der Vegt et al., 2002). In such circumstances, the presence of intensive knowledge-sharing routines is more likely, because these routines help integrate disparate, relevant knowledge spread across the firm (Floyd and Lane, 2000). Previous research shows that the presence of task interdependence creates strong incentives for intra-firm cooperation, particularly to connect disparate pieces of knowledge (Cabrera and Cabrera, 2005; Wageman and Baker, 1997). Hargadon and Sutton (1997) also indicate that when tasks are highly interdependent, managers feel strongly motivated to broker their knowledge with others to meet firm-level goals.

When managers depend on one another for the successful completion of tasks, it also is in their best interest to make their knowledge base available to colleagues, in anticipation that this openness will be reciprocated and others' knowledge can then be leveraged for the successful accomplishment of their own tasks (Cabrera and Cabrera, 2005; Lin, 2010). There may be an intrinsic motivational component underlying the relationship between task interdependence and internal knowledge sharing too, such that when managers rely on colleagues to accomplish tasks, their engagement in intensive knowledge sharing may create higher levels of satisfaction and feelings of belonging to their organization (Campion et al., 1996), which propel them to share their expertise and experiences. In contrast, when tasks can be undertaken individually and do not depend on

the input of others, the intrinsic motivation to engage in intensive knowledge sharing should be lower.

H<sub>2a</sub>: There is a positive relationship between the levels of task interdependence and knowledge sharing in SMEs.

#### *Role of Reward Interdependence*

Reward independence reflects the degree to which individual rewards are tied to the performance of others in the firm (Xie et al., 1997). We hypothesize a positive relationship between the reward interdependence in SMEs and the level of internal knowledge sharing. When the rewards of SME managers are connected with the performance of colleagues in the firm, internal collaborative behaviour should increase, ultimately leading to enhanced collective performance among the managers (Johnson and Johnson, 1989; Zhang et al., 2007). Similarly, previous research notes that in settings with high reward interdependence, managers tend to be more receptive to others' insights and expertise and openly exchange knowledge with one another, as a means to increase their individual rewards (Johnson and Johnson, 1989; Lin, 2010). In contrast, in SMEs marked by lower reward interdependence, managers experience less responsibility for others' work outcomes (Van Der Vegt et al., 1998) and are less inclined to share their knowledge bases with them.

In addition, SMEs marked by higher reward interdependence should exhibit more internal knowledge sharing, because such interdependence constitutes a normative form of control, rather than a purely utilitarian one based on individual interests (Bloom, 1999; Collins and Clark, 2003). Reward interdependence creates a sense of shared ownership throughout the firm's managerial base (McDonough, 2000), such that managers have an incentive to combine and integrate varied pieces of knowledge dispersed across the firm

(O'Reilly and Tushman, 2004). Similarly, Fairfield et al. (2004) show that the sense of being in the same boat, accomplished through reward interdependence, contributes to positive work behaviours such as intensive knowledge sharing.

H<sub>3a</sub>: There is a positive relationship between the level of reward interdependence and internal knowledge sharing in SMEs.

#### *Role of Social Interaction*

Social interaction captures the informal, personal nature of the relationships among SMEs' managers (Nahapiet and Ghoshal, 1998). We hypothesize that SMEs characterized by stronger social interactions exhibit higher levels of internal knowledge sharing. First, strong personal ties increase the likelihood of intensive knowledge exchanges, because personal comfort with undertaking such exchanges increases (Uzzi, 1997). Similarly, Heide and Miner (1992) indicate that close social interactions enhance the mutual adjustment and efforts to engage in shared problem solving through the establishment of knowledge routines. Thus, the presence of informal relationships reflects an organizational culture in which managers are more eager to share expertise and experiences, to help one another successfully undertake their jobs (Payne et al., 2011). In the same vein, Tsai and Ghoshal (1998) find that the informality of the interactions that take place among a firm's business units facilitates the exchange of resources, such that personal relationships lower the boundaries between units and encourage open knowledge flows.

Informal relationships also increase the ability to tap into a *broad*er array of knowledge when collaborating with peers in the firm (Woodman et al., 1993), such that the anticipated benefits of knowledge sharing are higher and the motivation to share knowledge increases. Nonaka (1994) indicates that social ties facilitate the transfer of not

only explicit knowledge but also more complex, tacit knowledge. Contrary to explicit knowledge, tacit knowledge is more hidden and more difficult to codify and communicate; it can be only expressed through deep involvement and action (Yli-Renko et al., 2001). Because such deep involvement is more likely in personal rather than impersonal relationships, the likelihood that both explicit and tacit knowledge gets exchanged should be higher when the SME's work context is marked by strong social interactions, and hence the overall level of knowledge sharing in these firms also will increase.

H<sub>4a</sub>: There is a positive relationship between the level of social interaction and internal knowledge sharing in SMEs.

#### *Role of Trust*

As noted, we conceptualize trust as the belief among SMEs' managers that their colleagues in the firm will not engage in opportunistic behaviour, even if the opportunity to do so arises (Zaheer et al., 1998). We hypothesize a positive relationship between the level of trust in SMEs and the level of internal knowledge sharing that they exhibit. The exchange of knowledge in any firm typically is hampered by at least some level of internal competition, whereby different managers or functional areas compete for firm-level resources in the pursuit of their own goals, agendas and strategic priorities (Luo et al., 2006; Tsai, 2002). Such rivalry effects may hamper the free exchange of knowledge, because individual-level interests take precedence over firm-level ones. In SMEs in which managers feel confident that their peers will *not* take advantage of them—such as by appropriating others' expertise to advance their own interests—the level of internal knowledge exchange, therefore, should be higher (Levin and Cross, 2004).

In conditions of high trust, the total amount of knowledge sharing also may increase, because managers are willing to exchange a wider set of knowledge than when no such trust is present (Zaheer et al., 1998). For example, in SMEs marked by higher trust levels, knowledge sharing likely includes the exchange of highly confidential or sensitive knowledge (De Clercq et al., 2011), such as knowledge derived from previous personal failures (De Luca and Atuahene-Gima, 2007). When managers can count on others' goodwill and do not fear that others will take advantage of their own shortcomings, they feel less restrained in sharing their previous experiences, whatever the nature of these experiences might be, because there is a lower risk that colleagues will opportunistically exploit them (Zaheer et al., 1998). Therefore, SMEs marked by higher levels of trust should exhibit more internal knowledge sharing.

H<sub>5a</sub>: There is a positive relationship between the level of trust and knowledge sharing in SMEs.

#### *Mediating Role of Internal Knowledge Sharing*

Combining the preceding arguments, we also hypothesize a mediating role of internal knowledge sharing, such that the structural and relational interdependences in SMEs increase their EO *through* internal knowledge sharing. This mediating role reflects that an important reason as to *why* the interconnectedness of SMEs' managers, either structural or relational, fuels entrepreneurial activities is the enhanced knowledge flows that emerge from it (Lin, 2010; Tsai & Ghoshal, 1998). Thus, internal knowledge sharing functions as a critical intermediate mechanism that relates SMEs' task and reward interdependence, as well as their social interaction and trust, to their entrepreneurial posture.



H<sub>2b</sub>: The level of internal knowledge sharing mediates the relationship between the level of task interdependence in SMEs and their EO.

H<sub>3b</sub>: The level of internal knowledge sharing mediates the relationship between the level of reward interdependence in SMEs and their EO.

H<sub>4b</sub>: The level of internal knowledge sharing mediates the relationship between the level of social interaction in SMEs and their EO.

H<sub>5b</sub>: The level of internal knowledge sharing mediates the relationship between the level of trust in SMEs and their EO.

## **Research Method**

### *Data Collection*

From a database maintained by a private market research company, we obtained a list of 1,500 randomly selected Canadian firms representative of the country's provinces and industrial sectors, on the basis of their alphabetical appearance in the database. As has prior research (e.g., Simons and Peterson, 2000; Song et al., 2006), we employed a single-respondent design and obtained the contact information of individual managers who worked in either a technology- or a marketing-related function in these firms. Extant research points to the critical role of these functional areas in shaping firms' entrepreneurial endeavours (Li and Calantone, 1998; Song and Parry, 1997). To ensure that the contacted managers were knowledgeable about their firms' entrepreneurial posture and overall internal functioning, we included only managers who held either a vice-president or director title as possible participants. We then sent a survey instrument to one randomly selected manager per firm.

To pretest the survey and ensure that our questions were clear and understandable, we undertook informal interviews with three academics and three managers (not included in the final sample) before the actual administration of the final version. We asked them

to point out ambiguous, vague or unfamiliar terms and incorporated their feedback to improve the study's readability and relevance (Podsakoff et al., 2003). To minimize the possibility that their responses were subject to biases due to social desirability, acquiescence or consistency with assumed research hypotheses, we guaranteed the participants complete confidentiality, repeatedly assured them during the survey that there were no right or wrong answers, and asked them to answer the questions as honestly as possible (Spector 2006). According to Podsakoff et al. (2003), these measures should help alleviate concerns with respect to common method bias (we also conducted formal statistical tests of common method bias, as we describe subsequently).

The data collection relied on Dillman's (1978) total design method. We prepared a mailing packet containing (1) a cover letter addressed personally to the sampled managers, (2) a questionnaire and (3) a postage-paid return envelope. Two weeks after the initial mailing, we called all the managers to thank those who had responded and remind those who had not. We sent replacement questionnaires to non-respondents four weeks after the initial mailing. We ended with 950 potential respondents and received 232 completed surveys. Because the database provided incomplete data related to the firms' sizes, we had no prior knowledge about whether the responding firms qualified as SMEs, which we defined as firms with fewer than 500 employees (Préfontaine and Bourgault, 2002). Our analyses focus on the 146 participating firms that met this criterion.<sup>5</sup> The average size of these firms was 128 employees, and the average firm age was 20 years. The participating firms belonged to the following industries: manufacturing

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<sup>5</sup> A follow-up analysis showed that our reported results were robust when applied to the complete sample of 232 firms, indicating their applicability across a wide spectrum of firms. Further, we did not find any significant differences between responding and nonresponding firms (regardless of size) in terms of their industry and location (province) distribution.

(43.1%), mining (10.3%), construction (1.4%), transportation (3.4%), wholesale (5.5%), retail (2.1%), finance (1.4%) and other services (32.8%). To check for nonresponse bias, we tested for any significant differences between the early and late respondents in the dependent, independent or control variables from the survey; no such differences emerged, so nonresponse bias was not an issue (Armstrong and Overton, 1977).

### *Measures*

The scales used to measure the constructs came from extant literature. All items were assessed on five-point Likert scales, ranging from 1 (strongly disagree) to 5 (strongly agree), and were normally distributed. The measurement items for each focal construct appear in the Appendix. In light of the firm-level focus of this study, for the questions with respect to knowledge sharing, structural interdependence and relational interdependence in SMEs, the respondents provided their opinions about the interactions and relationships between their firms' technically and commercially oriented functions *in general*, rather than the perspective of their own individual situation. As noted previously, our focus on these two broad function types follows arguments about their critical role in fostering firm-level entrepreneurship or innovation (De Luca and Atuahene-Gima, 2007; Griffin and Hauser, 1996; Song and Parry, 1993).<sup>6</sup>

*Entrepreneurial orientation.* Following prior research (Covin and Miles, 1999; Miller, 1983), we measured SMEs' entrepreneurial orientation using a seven-item scale that captures their level of innovation (e.g., introduction of new products), risk taking

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<sup>6</sup> To ensure that the responses would cover organization-wide phenomena rather than idiosyncratic, departmental issues, in the cover letter and survey instrument we defined function types broadly. We clarified that we were not interested in investigating interactions or relationships between specific departments, but rather between 'the managers who typically are most preoccupied with technological (or technical) issues such as operations, engineering, or research and development on one hand, and those who are typically most preoccupied with commercial activities such as marketing or sales on the other.'

(e.g., tolerance for high-risk projects) and proactiveness (e.g., bold, wide-ranging strategic actions rather than minor tactical changes) ( $\alpha = .81$ ).

*Internal knowledge sharing.* The four items used to measure internal knowledge sharing were adapted from prior research on communication frequency and bi-directionality in interfirm relationships (Mohr and Nevin, 1990; Yli-Renko et al., 2001). For example, respondents indicated whether managers across the different functional areas communicate openly and whether such communication occurs in two directions ( $\alpha = .92$ ).

*Task interdependence.* Drawing on prior research on interdependence in intra-firm interactions (Fisher et al., 1997; Ruekert and Walker, 1987), we measured the extent to which the tasks in the different functional areas were interdependent using three items. They captured managers' reliance on one another's resources, expertise and support to accomplish tasks ( $\alpha = .83$ ).

*Reward interdependence.* We measured the level of reward interdependence with three items that assessed the interdependence of functional areas' rewards (Xie et al., 2003). For example, respondents indicated the extent to which managers were evaluated on their joint performance instead of separate area performance and whether they shared the rewards of successfully commercialized new products ( $\alpha = .78$ ).

*Social interaction.* In accordance with prior studies (Tsai and Ghoshal, 1998; Yli-Renko et al., 2001), we measured social interaction with four items that reflected the strength of the social relationships between the functional areas. For example, the respondents rated the extent to which managers in the different functions knew one another on a personal level or maintained close social relationships ( $\alpha = .83$ ).

*Trust.* From interpersonal and inter-firm trust literature (Rempel et al., 1985; Yli-Renko et al., 2001), we applied four items that capture the presence of goodwill trust (Rousseau et al., 1998). Example items included respondents' beliefs that colleagues who worked in other functional areas would not take advantage of them, even if the opportunity arose, and that they were truly sincere in their promises ( $\alpha = .87$ ).

*Control variables.* We included several variables to account for alternative explanations for variations in internal knowledge sharing and entrepreneurial orientation and help avoid model misspecifications. First, *firm size* is the log transformation of the number of full-time employees. Second, *firm age* assessed the number of years the SME had been in business. Third, to control for external influences on the SMEs' EO and internal knowledge sharing, we controlled for whether their activities were mainly focused on *manufacturing* or *services* (using the latter as the base category), as well as the level of *external rivalry* in their industry, using a scale drawn from Maltz and Kohli (1996). Finally, we controlled for whether the respondent worked in a *technology-* (e.g., R&D, engineering) or *marketing-related* (e.g., marketing, sales) function.

Using AOM 20.0 software, we undertook confirmatory factor analysis (CFA) of the measurement model that included the six focal constructs. This measurement model fit the data well:  $\chi^2_{(262)} = 395.81$ , confirmatory fit index (CFI) = .93, Tucker-Lewis index (TLI) = .92 and root mean square error of approximation (RMSEA) = .059. The significant factor loadings ( $t > 2.0$ ; Gerbing and Anderson, 1988) provided evidence of the convergent validity of the scales. Further, as evidence of discriminant validity, none of the confidence intervals for the correlations between constructs included 1.0 ( $p < .05$ ) (Anderson and Gerbing, 1988), and the differences between the unconstrained model and

a constrained model for all 15 pairs of focal constructs were significant (Anderson and Gerbing, 1988).

We conducted several diagnostic analyses to rule out common method bias. First, a CFA for a single-factor model revealed a significantly poorer fit with the data than the fit of a six-factor model that included the study's focal constructs separately—which is an indication that common method bias should not be a serious concern (Anderson and Gerbing, 1988; Podsakoff et al., 2003). Second, in a structural equation modelling (SEM) follow-up analysis using AMOS, we compared the hypothesized model (Model 1; see Table 2 subsequently) with a parallel model that contained an additional common method factor on which each of the items of the study's constructs loaded (Podsakoff et al., 2003; Song et al., 2006). This analysis revealed no significant difference in fit ( $\Delta\chi^2$  [df = 1] = .57, *ns*) between the hypothesized model and the model that included the common method factor, providing further evidence that common method bias should not be a concern (Podsakoff et al., 2003). Finally, common method bias typically is less salient in studies that include highly educated respondents and multi-item scales (Bergkvist and Rossiter 2007). Taken together, these considerations alleviate concerns related to the use of common respondents in our study.

## **Results**

Table 1 includes the correlations and descriptive statistics, and Table 2 shows the hypothesis results using SEM. The SEM approach enabled an assessment of how well our conceptual model as a whole fit the data and whether internal knowledge sharing fully or partially mediated the relationships between the work context variables and EO (Anderson and Gerbing, 1988). In Table 2, Model 1 is the full mediation model that

includes all hypothesized relationships, whereas Models 2–5 are partial mediation models that add the direct effects of task interdependence, reward interdependence, social interaction and trust, respectively.

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Insert Tables 1 and 2 about here  
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The overall fit of the hypothesized framework (Model 1) was acceptable ( $\chi^2_{(389)} = 586.65$ , CFI = .90, TLI = .89 and RMSEA = .06), and the five hypothesized paths were statistically significant. Consistent with Hypothesis 1, we found a positive relationship between internal knowledge sharing and EO ( $\beta = .211$ ,  $p < .001$ ). Hypotheses 2a and 3a predicted positive relationships between task interdependence and reward interdependence with internal knowledge sharing; we found support for both ( $\beta = .427$ ,  $p < .001$ ;  $\beta = .238$ ,  $p < .05$ , respectively). We also confirmed Hypotheses 4a and 5a, noting positive relationships between social interaction and internal knowledge sharing ( $\beta = .147$ ,  $p < .05$ ) and between trust and internal knowledge sharing ( $\beta = .504$ ,  $p < .001$ ). It is further noteworthy that of all the control variables, only firm age reached statistical significance; particularly, younger firms exhibited a stronger entrepreneurial posture compared to their older counterparts ( $\beta = -.004$ ,  $p < .05$ ).

To test the mediation hypotheses (Hypotheses 2b–5b), we compared the fit of the full mediation model (Model 1) with that of the partial mediation modes (Models 2–5) (Anderson and Gerbing, 1988). We found that the fit of the more constrained, more parsimonious full mediation model was *not* significantly worse than that of the less constrained, more complex partial mediation models for the cases of task interdependence (Model 2 – Model 1:  $\Delta\chi^2$  [df = 1] = 1.30, *ns*) and trust (Model 5 – Model

1:  $\Delta\chi^2 [df = 1] = .15, ns$ ), which indicated that the full mediation model was the preferred model. Thus, internal knowledge sharing fully mediated the relationships between the task interdependence (Hypothesis 2b) and trust (Hypothesis 5b) in SMEs and their EO.

In turn, the fit of the partial mediation models, relative to that of the full mediation model, was significantly better for the cases of reward interdependence (Model 3 – Model 1:  $\Delta\chi^2 [df = 1] = 25.30, p < .001$ ) and social interaction (Model 4 – Model 1:  $\Delta\chi^2 [df = 1] = 7.28, p < .01$ ). In Table 2 we also find direct positive relationships between reward interdependence and EO (Model 3,  $\beta = .271, p < .01$ ) and between social interaction and EO (Model 4,  $\beta = .109, p < .05$ ). Thus, internal knowledge sharing partially mediated the relationships between the reward interdependence (Hypothesis 3b) and social interaction (Hypothesis 4b) in SMEs and their EO.

## **Discussion**

To gain a better understanding of how SMEs' internal work context can enhance their entrepreneurial posture, we have examined the critical mediating role that internal knowledge sharing plays between the structural and relational interdependence in SMEs and their entrepreneurial orientation. Prior SME research has devoted surprisingly little attention to the antecedents of EO, focused instead on the performance outcomes of EO. In particular, there is paucity of research that has explicitly investigated the roles that internal knowledge sharing routines and the SMEs' work context play in the formation of an entrepreneurial posture. Our main contribution lies in explicating internal knowledge flows as a critical mechanism that connects SMEs' organizational context characteristics with their entrepreneurial posture. Overall, we find strong support for our conceptual framework: SMEs marked by higher levels of internal knowledge sharing exhibit higher



EO, and such knowledge sharing derives from higher levels of structural and relational interdependence.

Although taking on an EO can lead to positive performance outcomes (Harms et al., 2010; Hughes and Morgan, 2007; Kraus et al., 2012), the pursuit of entrepreneurial activities also may be challenging for SMEs, because of their resource constraints (Lubatkin et al., 2006) and because such activities ‘involve radically changing internal organizational behavior patterns’ (Kuratko et al., 1990, p. 49). For example, managers may feel threatened by entrepreneurial opportunities that radically deviate from the firm’s status quo, because they could jeopardize current privileges and move those benefits to colleagues in other functional areas (Ireland et al., 2003). An important internal hurdle to SMEs’ adoption of an EO thus is managers’ fear that by exploiting entrepreneurial opportunities, they might lose access to firm resources, particularly if peers in other areas continue to support the status quo (Burgelman, 1991; Luo et al., 2006). Our findings suggest that this challenge is more easily overcome when SMEs are characterized by free knowledge flows that span different functional areas. Entrepreneurial opportunities typically encompass multiple facets of knowledge (Grégoire et al., 2010), which makes them less obvious to or not within the reach of individual managers. Thus, consistent with the knowledge-based view of the firm (Grant, 1996; Spender, 1996), the presence of strong knowledge sharing routines across the firm’s ranks is a powerful mechanism through which SMEs can be more entrepreneurial.

We also find that SMEs’ internal work context plays a critical role in facilitating such open knowledge sharing. Similar to the adoption of an EO, the promotion of company-wide knowledge sharing may be fraught with challenges, because the

interaction of managers from different functional areas brings together different ‘thoughtworlds’ (Griffin and Hauser, 1996) and attitudes (De Luca and Atuahene-Gima, 2007). For example, concerns about politics in resource distributions (Luo et al., 2006; Tsai, 2002), as well as goal conflicts among different functional areas (Ancona and Caldwell, 1992), may undermine managers’ propensity to collaborate and give one another access to their respective knowledge bases. Notably, cross-functional conflict between technology- and marketing-related functions may include the former’s long-term-oriented focus on technological superiority versus the latter’s concern about satisfying short-term customer needs (Song and Parry, 1993).

This study’s findings indicate that high levels of structural and relational interdependence in SMEs may help alleviate these challenges and fuel internal knowledge sharing. In particular, dependence on both others’ input (task interdependence) and their output (reward dependence) encourages internal knowledge sharing within SMEs’ ranks. Whereas task interdependence stimulates internal knowledge sharing, because such sharing contributes to the successful undertaking of complex, interdependent tasks (Fisher et al., 1997), reward interdependence—or the dependence of individual rewards on collective performance—functions according to the perceived need to help others perform better, as well as the anticipation that granting others access to function-specific expertise will prompt reciprocation and facilitate one’s own performance (O’Reilly and Tushman, 2003). Similarly, the two aspects of SMEs’ relational interdependence, social interaction and trust, relate positively to the level of knowledge sharing. Thus, the presence of strong informal relationships that extend beyond formal work settings and the belief that managers can be trusted not to take

advantage of others' shared expertise both increase the likelihood that knowledge gets unlocked from its holders and freely shared across the firm's ranks (Nahapiet and Ghoshal, 1998; Payne et al., 2011).

Finally, this study reveals that whereas internal knowledge sharing *fully* mediates the relationships between SMEs' task interdependence and trust with EO, the levels of reward interdependence and social interaction increase EO both directly and indirectly. Thus, the contribution of task interdependence and trust to SMEs' entrepreneurial activities is completely explained by the promotion of internal knowledge flows that these two elements of the organizational context cause. Yet reward interdependence and social interaction increase SMEs' EO over and beyond their effects on internal knowledge sharing. On the one hand, the direct effect of reward interdependence on EO may stem from the pursuit of entrepreneurial opportunities, which demands transcending individual interests, across functional boundaries (Floyd and Lane, 2000). Rewarding managers for their collective performance can stimulate such transcendence (Collins and Smith, 2006); this effect occurs in parallel with an indirect influence of reward interdependence through enhanced internal knowledge sharing. Similarly, individual managers could be myopic regarding the opportunities for exploiting entrepreneurial ideas, but SMEs' senior management should have a better perspective on how a firm's rewards system can stimulate cross-functional synergies, such that reward interdependence directly stimulates EO (Gilbert, 2006; Smith and Tushman, 2005). On the other hand, the direct effect of social interaction on EO, beyond the intermediary role of internal knowledge sharing, implies that strong, informal relationships may create an

organizational culture in which managers feel comfortable to undertake risky actions and seek to extend the firm's current activity.

Taken together, these findings highlight the roles of hitherto underexplored aspects of SMEs' internal work context in relation to the adoption of an entrepreneurial posture, as well as the critical mediating role of internal knowledge sharing. Internal organizational conditions marked by higher levels of structural and relational interdependence enhance SMEs' propensity to adopt an EO, fuelled by the combination of function-specific knowledge across the firms' ranks.

#### *Limitations and Future Research*

This study contains some limitations that offer avenues for further research. First, the empirical assessment of knowledge sharing is a daunting task (Grant, 1996), and therefore our measure of internal knowledge sharing may not have captured important underlying nuances. In particular, we examined the level of internal knowledge sharing in *general*, thereby excluding some useful knowledge distinctions, such as explicit versus tacit (Nonaka, 1994) or declarative versus procedural (Berge and van Hezewijk, 1999). Additional research could explore whether the mediating effect of internal knowledge sharing might work differently for different facets of knowledge. For example, the work context variables we studied herein may be most useful for the exchange of tacit knowledge, which tends to come less easily to the surface (Yli-Renko et al., 2001). Further, future studies that predict SMEs' entrepreneurial activities could examine the role of internal knowledge sharing in combination with the knowledge flows that take place with external stakeholders (Yli-Renko et al., 2001).

Second, by focusing on only two work context dimensions (structural and relational interdependence), we ignored other contextual factors that may be relevant for the promotion of internal knowledge sharing, such as the extent to which decision-making processes are decentralized and do not follow preset rules (Dyer and Song, 1998), or the emotional attachment that managers feel toward their firm (Meyer et al., 2004).

Third, because this study relies on cross-sectional data, reverse causality may be an issue, such that enhanced EO levels, for example, might fuel intense internal knowledge flows through the cross-disciplinary nature of such activity (Grégoire et al., 2010). Additional research should elucidate and distinguish among various internal causal processes by using longitudinal designs to study the interrelationships among SMEs' work context, internal knowledge flows and EO.

Fourth, our single-respondent design might raise concerns about common method bias, despite the many cautionary measures taken in the research design and the reported statistical evidence against its presence. Researchers could collect data from multiple respondents in each firm, particularly to measure SMEs' internal knowledge sharing and relationship development, which entail exchanges between at least two parties.

Fifth, cross-country studies could investigate whether the mediating role of internal knowledge sharing between SMEs' work context and EO may vary across different countries. For example, such studies could pay attention to the potential roles of cultural values that determine the importance of collective task accomplishment and social relationship building (Hofstede, 2001).

#### *Practical Implications*

From a practical perspective, this study shows that in the pursuit of an entrepreneurial orientation, SMEs should foster intensive intra-firm knowledge exchanges. Different functional areas can play complementary roles in the entrepreneurial process, such that technology-oriented managers, for example, attend to the technical aspects of entrepreneurial opportunities, while marketing-oriented managers consider how such opportunities can create value in new or existing market spaces (Burgelman, 1991). High EO levels may be more difficult to attain when managers in different functional areas have limited understanding of how others' knowledge bases contribute to the development of novel ideas.

Further, SMEs should understand how such knowledge sharing can be promoted by establishing appropriate internal work conditions. The propensity to share function-specific knowledge may be more challenging to the extent that managers operate *independently* from one another. Thus, there is a need to create at least some structural interdependence among managers, such as that pertaining to the input needed to complete daily tasks and how individual rewards depend on others' performance. Finally, SMEs should seek to stimulate the creation of a relational context that encourages informal interactions and trust development. Ultimately, to the extent that managers move away from their function-specific identities as 'just' technologically or commercially oriented actors, and instead see themselves as partners who care for one another and for the firm's well-being, different knowledge bases that reside in SMEs can be combined more easily, which should fuel entrepreneurial behaviours.

### *Conclusion*

To summarize, this study has directed greater attention to the internal mechanisms that might explain SMEs' entrepreneurial orientation, particularly in relation to the roles of internal knowledge sharing and structural and relational interdependence. We have shown that the level of knowledge sharing in SMEs acts as a critical mechanism through which features of the internal work context increase an EO. We hope that this work functions as a catalyst for further understanding of how SMEs might translate their knowledge base into stronger competitive positions in the marketplace, through their involvement in entrepreneurial endeavours.

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Table 1. Descriptive statistics and correlations (N = 146)

	1	2	3	4	5	6	7	8	9	10	11
1. Entrepreneurial orientation											
2. Internal knowledge sharing	.379**										
3. Task interdependence	.125	.481**									
4. Reward interdependence	.467**	.559**	.304**								
5. Social interaction	.397**	.471**	.111	.458**							
6. Trust	.300**	.661**	.309**	.526**	.365**						
7. Firm size	-.094	-.044	-.008	-.243**	-.195*	.006					
8. Firm age	-.208*	-.135	-.049	-.138	-.206*	-.107	.446**				
9. Manufacturing industry	.070	-.033	.086	.081	-.059	.047	.090	.048			
10. External rivalry	.018	-.016	.032	-.008	-.105	.050	.060	.074	.032		
11. Marketing-related function	-.070	.031	.041	.008	-.031	.163*	.242**	.273**	-.141	.092	
Mean	3.123	3.491	3.724	3.233	2.875	3.438	128.452	20.260	.336	3.244	.445
Standard deviation	.765	.926	.882	.941	.832	.850	112.959	19.645	.474	.653	.499

\*\* $p < .01$ ; \* $p < .05$ .

Table 2. Structural equation modelling results (N = 146)

	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Effects on EO (focal variables)</i>					
H1: Internal knowledge sharing	.211***	.244***	.019	.165**	.193*
H2b: Task interdependence		-.077			
H3b: Reward interdependence			.271**		
H4b: Social interaction				.109*	
H5b: Trust					.027
<i>Effects on internal knowledge sharing (focal variables)</i>					
H2a: Task interdependence	.427***	.438***	.443***	.433***	.430***
H3a: Reward interdependence	.238*	.245*	.206*	.231*	.234*
H4a: Social interaction	.147*	.147*	.141*	.137*	.147*
H5a: Trust	.504***	.495***	.522***	.510***	.504***
<i>Effects on EO (control variables)</i>					
Firm size (log)	.044	.043	.073*	.052 <sup>+</sup>	.043
Firm age	-.004*	-.004*	-.003*	-.003 <sup>+</sup>	-.004*
Manufacturing industry <sup>a</sup>	.069	.080	.009	.072	.065
External rivalry	.055	.058	.049	.067	-.035
Marketing-related function <sup>b</sup>	-.030	-.028	-.050	-.034	.053
<i>Effects on internal knowledge sharing (control variables)</i>					
Firm size (log)	.027	.029	.022	.026	.027
Firm age	-.001	-.001	-.001	-.001	-.001
Manufacturing industry <sup>a</sup>	-.183 <sup>+</sup>	-.185 <sup>+</sup>	-.184 <sup>+</sup>	-.183 <sup>+</sup>	-.183 <sup>+</sup>
External rivalry	-.046	-.046	-.049	-.048	-.046
Marketing-related function <sup>b</sup>	-.083	-.084	-.085	-.083	-.083
<i>Fit indices</i>					
$\chi^2$	586.65	585.35	561.35	579.37	586.50
(df)	(389)	(388)	(388)	(388)	(388)
CFI	.904	.904	.916	.907	.904
TLI	.893	.893	.906	.896	.892
RMSEA	.059	.059	.056	.058	.059

Notes: Unstandardized coefficients (two-tailed *p*-values).

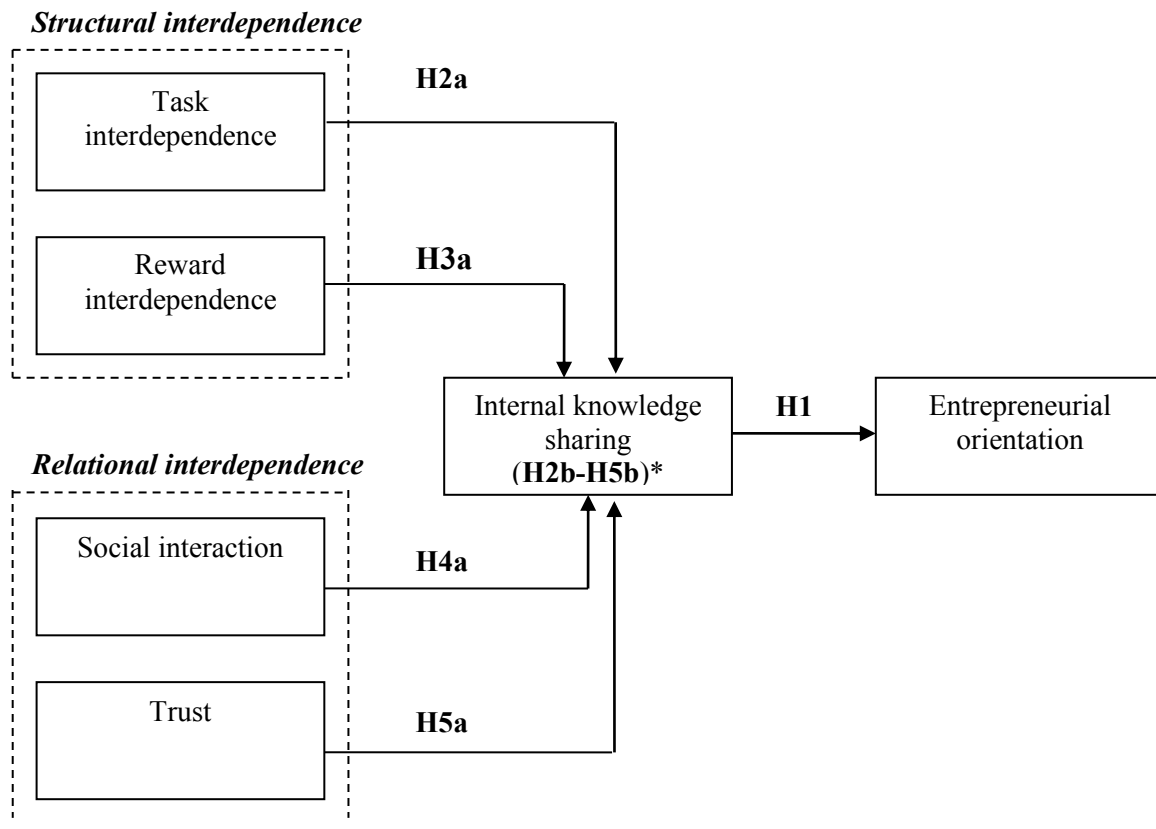
\*\*\**p* < .001; \*\**p* < .01; \**p* < .05; <sup>+</sup>*p* < .10

<sup>a</sup> Base case = services industry.

<sup>b</sup> Base case = technology-related function.



Figure 1. Conceptual framework



\* Note: H2b-H5b posit a mediating role of internal knowledge sharing between task interdependence, reward interdependence, social interaction, and trust on the one hand, and entrepreneurial orientation on the other.

## **Appendix**

### **Scale items**

#### **Entrepreneurial orientation**

- Our company spends more time on long-term R&D (3+ years) than on short-term R&D.
- Our company is usually among the first in the industry to introduce new products.
- Our company rewards risk taking.
- Our company shows a great deal of tolerance for high-risk projects.
- Our company uses only 'tried-and-true' procedures, systems, and methods. (reverse coded)
- Our company challenges, rather than responds to, its major competitors.
- Our company takes bold, wide-ranging strategic actions rather than minor changes in tactics.

#### **Internal knowledge sharing**

- There is open communication between managers in the two functions.
- There is a high level of knowledge sharing between managers in the two functions.
- Managers in the two functions have great dialogues with each other.
- There is a lot of two-way communication between managers in the two functions.

#### **Task interdependence**

The two functions are highly dependent on:

- each other's resources (e.g., personnel, information, equipment) to accomplish their jobs successfully.
- each other's support (e.g., advice or technical assistance) to accomplish their jobs successfully.
- each other's information and expertise to accomplish their jobs successfully.

#### **Reward interdependence**

- The two functions share the rewards of a successfully commercialized new product.
- The two functions are evaluated on their joint performance instead of separate function-specific performance.
- Senior management promotes cross-functional team cohesion over separate function-specific loyalty.

#### **Social interaction**

- Managers in the two functions spend significant time together in social situations.
- Managers in the two functions maintain close social relationships with one another.
- Managers in the two functions know members of the other function on a personal level.
- The relationship between managers in the two functions is very informal.

#### **Trust**

With respect to the nature of the relationship between the two functions:

- Managers can always be trusted to do what is right.
- Managers are perfectly honest and truthful.
- Managers are truly sincere in their promises.
- Managers would not take advantage of others, even if the opportunity arose.